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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/749,726	12/30/2003	Yie-Shein Her	FER-266.001	9061
7609	7590	12/12/2005	EXAMINER	
RANKIN, HILL, PORTER & CLARK, LLP 925 EUCLID AVENUE, SUITE 700 CLEVELAND, OH 44115-1405			VINH, LAN	
			ART UNIT	PAPER NUMBER
			1765	
DATE MAILED: 12/12/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

### Office Action Summary

Application No.

10/749,726

<b>Applicant(s)</b>
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HER ET AL.

**Examiner**

Lan Vinh

### Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 30 December 2003.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 22704.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Double Patenting***

1. Claim 5 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim
2. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-3, 5-6, 8-18 are rejected under 35 U.S.C. 102(e) as being anticipated by Hardy et al (US 6,238,592)

Hardy discloses a method for modifying structure using a chemical-mechanical working liquid having abrasive particulates /slurry for use to remove a barrier layer 13 (TiN) formed on an underlying dielectric layer 16. The method comprises the step of polishing the barrier layer 13 using a CMP slurry, the CMP slurry comprises a buffer /agent such as lysine (C<sub>6</sub>H<sub>14</sub>N<sub>2</sub>O<sub>2</sub>), arginine (C<sub>6</sub>H<sub>14</sub>N<sub>4</sub>O<sub>2</sub>) (col 7, lines 60-65; col 9,

Art Unit: 1765

lines 30-52; fig. 2 shows that the dielectric layer is not completely removed during the polishing step/the rate at which the underlying dielectric is removed is suppressed.

Since Hardy discloses the same method using the same materials (TiN, dielectric, lysine/arginine ) as the claimed invention, under the principle of inherency, the argine/lysine in Hardy CMP slurry would have suppressed the rate at which the underlying silicon-containing dielectric layer is removed

The limitations of claims 2-3, 5-6, 10 have been discussed above

Regarding claim 8, Hardy discloses that the barrier layer comprises TaN (col 5, lines 19-21)

Regarding claims 9, 11, Hardy discloses using the additive/buffers to span the pH of the working liquid/slurry from acidic (pH is about 7.0 or lower ) to basic (pH is about 7.0 or higher ) ( col 9, lines 35-40)

Regarding claims 12-13, Hardy discloses that the working liquid/slurry contains abrasive particles include: silica, zirconia, ceria ( col 9, lines 60-65 )

Regarding claims 14-15, Hardy discloses that the working liquid/slurry comprises peroxides/ oxidizing agent ( col 8, lines 43-46)

Regarding claims 16-17, Hardy discloses that the working liquid/slurry comprises DI water/solvent ( col 8, lines 60-65 )

Regarding claim 18, Hardy discloses that the underlying layer can be single crystal silicon (col 6, lines 5-10)

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 4, 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hardy et al (US 6,238,592) in view of Grumbine et al. (US 6,136,711)

Hardy method has been described above, unlike the instant claimed inventions as per claims 4, 7, Hardy fails to disclose the specific concentration of the agent/lysine/arginine in the slurry

Grumbine discloses a polishing composition/ slurry to polish TiN layer/barrier layer , the slurry comprises from about 0. 001 to about 2.0 weight percent of lysine ( col 3, lines 55-60; col 6, lines 5-23 )

Since Hardy discloses that the concentration of the buffer agent is/varies between about 1.0% and about 8% (col 10, lines 19-21), one skilled in the art at the time the invention was made would have found it obvious to modify Hardy method by discovering the optimum concentration of the lysine in the slurry as taught by Grumbine because it has been held that discovering an optimum value of a result variable involves only routine skill in the art. In re claim Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)

***Conclusion***

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lan Vinh whose telephone number is 571 272 1471. The examiner can normally be reached on M-F 8:30-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571 272 1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



LV  
December 7, 2005